

REMARKS/ARGUMENTS

The above amendments to the specification were made in order to incorporate all amendments to the specification made in parent application Serial No. 10/294,553.

In parent application Serial No. 10/294,553, the Examiner indicated that the claims as proposed in the amendment of June 11, 2003 remain unpatentable over the cited prior art references for the same reasons as set forth in the Official Action of April 23, 2003. In that Action, the Examiner rejected claim 1 as anticipated by EP 1022434, and also rejected claims 1-10 under 35 U.S.C. 103 as unpatentable over the admitted prior art (pages 1, 2, 4 and 5 of the specification and Figures 1-4) and further in view of EP 1022434.

The anticipation rejection is improper for the reasons that follow.

In the '434 reference, no core for a shell die or mold is shown. The reference does teach in column 1 that ceramic cores are often used to form the cooling cavities and passages within the airfoil portions of buckets and nozzles. The reference also states that:

...The ceramic core is essentially a solid body which is shaped to conform to the complex interior cooling passages of the bucket or nozzle (for simplicity, reference will be made herein simply to the "bucket," but it will be understood that the invention is applicable to both rotating buckets as well as stationary nozzles). The core is placed within a casting mold prior to pouring of molten metal into the mold. The casting mold consists of a ceramic shell which confines the molten metal, forms the exterior shape of the bucket, and fixes the ceramic core within the bucket.

The '434 reference also speaks of cooling passage connectors used in cores for gas turbine buckets that are removed from the core prior to casting. The reference goes on to

explain that prior practice includes stiffening the internal core by tying the adjacent ceramic coolant passage sections with quartz cross ties to enhance stiffness. The invention in the '434 patent relates to the cross-sectional shape of these cross ties and specifically to an elliptical cross tie shape designed such that, after the core is removed, the elliptical passages that remain in the bucket have reduced stress concentrations.

While the cross ties may be utilized to add stiffness to the ceramic coolant passage sections of the core, there is no disclosure or suggestion that such cross ties are used to fix or support the core to the shell die itself. Moreover, there is no disclosure or suggestion in the '434 patent of reducing stress in the cross ties themselves, or at locations where the cross ties are fitted to the core. Rather, the focus is on the elliptical passages that result after the cross ties have been removed.

In order to more clearly distinguish the subject matter of claim 1 from that of the '434 patent, applicant has further amended claim 1 to require a core for a shell die adapted for use in casting a turbine bucket including an airfoil portion, a shank portion and a mounting portion. The claim also requires that the core support pin extend transversely of the elongated body and be adapted to support the core inside the shell die. In addition, the claim has been amended to require that the at least one core support pin be joined to the elongated body of the core by a fillet and that the support pin have an elliptical shape in cross section for reduction of stress at the fillet. Finally, the claim has further been amended to require that the support pin be adapted to engage a core support boss in the shell die in the shank portion.

Based on the discussion above, it is apparent that the subject matter of claim 1 as amended is not disclosed in the '434 patent and clearly, the anticipation rejection has been overcome.

The Examiner has also rejected claims 1-10 under 35 U.S.C. 103 as unpatentable over the acknowledged prior art in view of '434. According to the Examiner, it would have been obvious to form the openings in the turbine bucket of an elliptical cross sectional shape as taught by EP '434 in order to minimize the stress concentration.

As already indicated above, the cross ties disclosed in EP '434 bear no relationship to the support pins of the present invention. As such, one of ordinary skill in the art would not have availed himself of any information in the '434 patent that would have suggested modification of the core support pin of the acknowledged prior art. The only way such a combination could be achieved is with the utilization of impermissible hindsight. For example, there are no weight bearing or structural/functional considerations relating to the core in the formation of the elliptical cross passages as disclosed in the '434 patent. On the contrary, weight bearing and structural/functional considerations relating to the core are very much the issue with the core support pins claimed here insofar as they must carry the weight of the core support itself within the shell die during casting of the turbine bucket. Further in this regard, the core support is a one piece ceramic body including the integral core support pins, with fillets between the pins and the elongated core body. The '434 patent uses separate quartz tie rods that extend between the coolant passages of the core, and note also that none of the quartz

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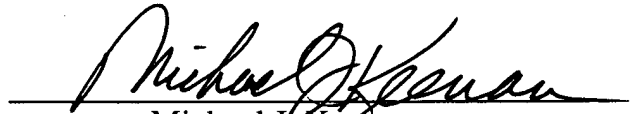
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rods are utilized in the radially inner shank portion of the bucket as required by claims 1 and 5. Moreover, none of the quartz rods are used to support or attach the core to the shell die. In summary, absent knowledge gained from applicant's own disclosure, one of ordinary skill in the art would have had no reason to modify the acknowledged prior art based on any information contained in the '434 reference, in order to meet the terms of either of claims 1 or 5. Accordingly, independent claims 1 and 5, along with remaining dependent claims 2, 4, 6, 7, 9 and 10 are now in condition for allowance and early passage to issue is requested. In the event, however, any small matters remain outstanding, the Examiner is encouraged to telephone the undersigned in order to expedite the prosecution of this application.

Respectfully submitted,

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